

A3  
cont

species. H2AX differs from the other two H2A proteins, H2A1-H2A2 and H2AZ, by the presence of a conserved motif at the C-terminus (Mannironi et al., Nucleic Acid Research, 17, 9113-9125 (1989)). Preferably, the C-terminus of the H2A histone protein of the present invention comprises the amino acid sequence SQ(D/E/A)(I/L/Y/F) (SEQ ID NO: 1). It is the phosphorylation of the serine in the motif, residue 139 in mammals, that yields the modified form named  $\gamma$ -H2AX.

In the Claims:

Cancel claims 1-26.

Add the following claims:

27. A kit for determining DNA double-stranded breaks, wherein said kit comprises (i) an isolated or purified antibody or antigenically-reactive fragment thereof that binds to a C-terminal amino acid sequence of an H2A histone protein, said C-terminal amino acid sequence consisting of SQ(D/E/A)(I/L/Y/F) (SEQ ID NO:1) that comprises a phosphorylated serine, wherein the antibody or antigenically reactive fragment thereof does not detectably bind to a C-terminal amino acid sequence of an H2A histone protein, said C-terminal amino acid sequence consisting of SQ(D/E/A)(I/L/Y/F) (SEQ ID NO:1) that does not comprise a phosphorylated serine under conditions when the isolated or purified antibody or antigenically-reactive fragment thereof binds to the C-terminal amino acid sequence of an H2A histone protein, said C-terminal amino acid sequence consisting of SQ(D/E/A)(I/L/Y/F) (SEQ ID NO:1) that comprises a phosphorylated serine, and (ii) a means of facilitating detection of binding of said antibody or antigenically-reactive fragment thereof to an H2A histone protein.

28. The kit of claim 27, wherein said phosphorylated serine is about four amino acids from the C-terminus of said H2A histone protein.

29. The kit of claim 27, wherein said fragment is selected from the group consisting of Fab, Fab', F(ab')<sub>2</sub>, and F(v).

30. The kit of claim 27, wherein said H2A histone protein is mammalian.

Rule 1.126

A4  
Cont

31. The kit of claim 30, wherein said H2A histone protein is H2AX.

~~32~~  
33. The kit of claim 1, wherein said means of facilitating detection is an enzyme, a radioactive isotope, a fluorescent molecule, biotin, or a labeled secondary antibody that detects binding of said antibody or antigenically-reactive fragment thereof to said H2A histone protein.

~~33~~  
34. The kit of claim 33, wherein said labeled secondary antibody is linked to an enzyme.